RESEARCH NOTES :

Madras agric J. 62 (4) : 217—218, April, 1975.

Discriminant Function Analysis in Lentil (*Lens esculenta* Moech.)

Discriminant function analysis is a technique which is adopted for constructing suitable selection indices for making the selection of desirable genotypes. In this technique the phenotypic values are so weighted as to give maximum score for the individual desired character. Smith (1939) was the pioneer worker to use this technique for plant selection. Later on importance of selection index over the straight method of selection was emphasized by Simlote (1957) in durum wheat, Johnson *et al.* (1955) and Malhotra (1973) in soybean, Singh and Mehndiratta (1970) in cowpea. The present investigation was undertaken to study the application of this technique in improving the grain yield of lentil.

An experiment of 30 diverse strains of lentil was laid out in a randomised block design with four replications during rabi 1972—'73. Each plot was represented by six rows of 5 metre length spaced at 25 cm. Five plants were randomly selected from each plot and observations were recorded on five characters *viz.*, number of primary branches per plant (X_1), no. of pods per cluster (X_2), number of seeds per pod (X_3), 250 grain weight (X_4) and grain yield per plant (X_5). Sixteen selection indices were constructed, according to the procedure used by Robinson *et al.* (1971), taking one, two, three and four of the above characters at a time. The expected genetic advance for different selection indices was calculated at 5 per cent intensity of selection. The relative efficiency of every selection index was calculated assuming the efficiency achieved through straight selection for grain yield as 100.

It was observed that selection indices based on single characters were much less efficient than selection based on grain yield alone. Among the single characters other than yield, the highest relative efficiency was obtained with 250 grain weight (89·47 per cent.) When two characters were taken at a time the combination of number of seeds per pod and 250 grain weight gave the highest relative efficiency (105·74 per cent). Among the combinations of three characters the highest relative efficiency was achieved when the selection index was based on number of pods per cluster, number of seeds per pod and 250 grain weight. The relative efficiency was the highest (134·24 per cent) among all the combinations of characters when the selection index was based on four characters *viz.*, number of primary branches, number of pods per cluster, number of seeds per pod and 250 grain weight.

The results of the present study reveal that greater the number of characters included in a selection index, the higher is the efficiency of selection. A maximum gain of about 34 per cent over straight selection could be

TABLE 1. Selection index, discriminant function, expected genetic advance and relative efficiency of different selection indices

Selection index	Discriminant function	Expected genetic advance	Relative efficiency
X_5	$Y = 1.0342\ X_5$	2.79	100.00
X_1	$Y = 0.1112\ X_1$	0.68	24.37
X_2	$Y = 0.3964\ X_2$	0.66	23.42
X_3	$Y = 6.2851\ X_3$	1.33	47.42
X_4	$Y = 1.6613\ X_4$	2.50	89.47
$X_1\ X_2$	$Y = 0.1172\ X_1 + 0.4135\ X_2$	0.99	35.35
$X_1\ X_3$	$Y = 0.0357\ X_1 + 6.4604\ X_3$	1.35	48.38
$X_1\ X_4$	$Y = 0.3276\ X_1 + 2.1125\ X_4$	2.86	102.21
$X_2\ X_3$	$Y = 1.1804\ X_2 + 7.3416\ X_3$	1.49	53.39
$X_2\ X_4$	$Y = 2.5639\ X_2 + 2.0941\ X_4$	2.88	102.87
$X_3\ X_4$	$Y = 7.5113\ X_3 + 1.7634\ X_4$	2.96	105.74
$X_1\ X_2\ X_3$	$Y = 0.8364\ X_1 + 1.1815\ X_2 + 7.3004\ X_3$	2.90	103.53
$X_1\ X_2\ X_4$	$Y = 0.3647\ X_1 + 9.3426\ X_2 + 1.6423\ X_4$	2.80	100.07
$X_1\ X_3\ X_4$	$Y = 0.1583\ X_1 + 5.2947\ X_3 + 2.0214\ X_4$	3.21	11.458
$X_2\ X_3\ X_4$	$Y = 4.2261\ X_2 + 11.8794\ X_3 + 2.5334\ X_4$	3.68	131.44
$X_1\ X_2\ X_3\ X_4$	$Y = 0.2883\ X_1 + 4.4055\ X_2 + 11.5076\ X_3 + 2.6604\ X_4$	3.76	134.24

achieved for grain yield in lentil when the selection is based on suitable selection index.

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